

Pairing Wireless Medical Devices

Stryker Endoscopy

Stryker Corporation is one of the world's leading medical technology companies. As the technology leader in minimally invasive surgery, Stryker Endoscopy offers comprehensive solutions to meet the changing needs of the high-tech operating room. Combining voice activation, infrared imaging and high-definition video technology with a market-leading data management system, Stryker offers a surgical environment designed to improve patient outcomes.



Applications:
Linking Wireless Devices

Market:
Medical



Designing a product that will use wireless communications can pose many design challenges. These challenges take on added significance when the wireless product is a medical device. With the proliferation of wireless medical devices in-and-around operating rooms, it is critically important that these wireless medical devices be able to coexist with each other.

Wireless coexistence is the ability of one wireless system to perform a task in a given shared environment where other systems (in that environment) have an ability to perform their tasks and might or might not be using the same set of rules.¹ When designing a wireless medical device, one particular coexistence consideration is how to ensure that the device will coexist with other instances of the same device located in the same room or nearby. This was one of the design challenges faced by engineers at Stryker Endoscopy when they designed their WiSe Wireless Platform.

Stryker's WiSe HDTV Transmitter and WiSe HDTV Surgical Display allow surgical video captured by HD camera systems, as well as video signals from other devices like surgical robots and radiology devices, to be transmitted wirelessly and displayed remotely in high definition. The wireless connection allows operating room personnel to position the remote monitors in their desired locations without having to account for lengthy video cables. The WiSe system even allows video from a single camera to be shown concurrently on multiple displays.

"With WiSe systems, it is important for us to ensure that a transmitter and display are linked intentionally," said John Shen, Senior R&D Manager for Stryker. "That is, we needed to make sure that a transmitter or display didn't accidentally link to a display or transmitter in a different operating room. With the wireless signals penetrating walls, ceilings and floors, it was important to ensure intentional linking, both for accuracy and for HIPAA compliance."

¹ <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm077210.htm>

Portable Memory Establishes Link

To ensure that there is an intentional link between a WiSe HDTV Transmitter and a WiSe HDTV Surgical Display, Stryker chose to use a portable memory device to carry link information from the transmitter to the receiver (display). In selecting a portable memory solution, Stryker wanted a memory device with the following characteristics:

- Long-term Availability
- Proven Technology
- Proven Manufacturer
- Simplicity of Design
- High Reliability
- High Durability
- Security



Stryker reached out to ATEK Access Technologies and selected its Datakey extended SlimLine™ memory token. For the mating receptacle, ATEK selected the SR4210 panel-mount receptacle. Together, this system met all of the characteristics Stryker was looking for.

“We didn’t want to use a consumer memory device, like an SD card or a USB flash drive, due to the possibility of loss/misuse, as well as the fact that it is difficult to support all of the variations of these devices,” said Shen.

An Improved Solution

The memory token utilizes solid over-molded construction, so the memory IC is completely encased in a durable, custom composite material. This makes the memory token impervious to liquids and long lasting. The tokens can even be sterilized by an autoclave or via an EtO gas process, although not a design requirement for Stryker, as both the display and the transmitter are used outside the sterile zone.

In addition to the token, the receptacle is also very durable. Its contacts are rated for 50,000 insertion-and-removal cycles, which ensures that a receptacle should never wear out during the life of the transmitter/display. As a point of comparison, a typical USB receptacle is only rated for 1,500 cycles.

Since 2009, the WiSe Wireless Platform by Stryker has been allowing hospitals to confidently view live video from surgeries without the pitfalls of video wires. In 2013, Stryker launched SYNK, its second generation wireless platform, which also uses Datakey SlimLine memory tokens.

“We had great luck with Datakey tokens in the WiSe Wireless Platform,” said Jake Thiede, Product Manager for Stryker Endoscopy. “We’ve definitely prevailed as best-in-class in terms of wireless video systems in the OR with the WiSe platform.”

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